# CENTRAL LAKE ONTARIO CONSERVATION REPORT

## WILDLIFE

ONTARIO DEPARTMENT OF PLANNING AND DEVELOPMENT

CONSERVATION BRANCH

# CENTRAL LAKE ONTARIO

## CONSERVATION REPORT

---

## WILDLIFE

1960

## AUTHORSHIP

The field work was directed and the report written by K. M. Mayall, R.P.F.

Editing and format were under the supervision of A. H. Richardson, R.P.F., P.Eng., assisted by A.S.L. Barnes, R.P.F.

TABLE OF CONTENTS



CONTENTS



ILLUSTRATIONS



MAPS

## RECOMMENDATIONS

## STATED OR IMPLIED IN THIS REPORT

1. That the Authority encourage interested landowners to improve their land for wildlife by the elimination of grazing of woodlands, by selective cutting in woodlands, by improved cultivation practices, by the planting of certain species of plants suitable for food and cover, and by the construction of farm ponds specifically for fish and wildlife. pp. 10-14

2. That the Conservation Authority urge that the stocking of fish in this watershed be restricted to those streams which have been shown on the map accompanying this report to be suitable for the species concerned. p. 17

3. That the Conservation Authority acquire the marsh known as the Cranberry Marsh and the beach adjoining it, as a Conservation Area, as a refuge for many species of birds. p. 33

4. That the Conservation Authority establish a Pollution Advisory Board. p. 21

# CHAPTER 1

## INTRODUCTION

Wildlife can and should be a valuable self-sustaining natural resource in both the agricultural and forested parts of Ontario. The Central Lake Ontario region is no exception. The region includes much rough land now best suited to forestry and permanent pasture, and a great many excellent springs which provide water with temperatures suitable for brook trout and brown trout.

The region includes a large and apparently expanding urban area along the shore of Lake Ontario, including Oshawa, Whitby and Bowmanville. The non-urban land is therefore visited by considerable numbers of people, including hunters looking for upland game, fishermen seeking fish, and a growing army of naturalists interested in the opportunities to see and enjoy the fine views along the hills and shorelines, and to see the varied forms of animal and plant life.

In the northern part of the watershed, by careful handling of the wildlife habitat and by managing their numbers, wildlife populations should have no adverse effect on most good land use practices. In many areas the best farm husbandry and the best methods of handling mixed woodlands go hand in hand with good conditions for most species of wildlife. The porcupine, the white-tailed deer and the meadow mouse (with occasional aid from other mice) seem to be the only species which may come into serious conflict with man's interests. Beaver are not common.

On the first-rate soils found between gullies in Ontario County, it is more difficult to justify the production of wildlife, other than those insects needed for pollination and some birds which eat weed seeds or destructive insects. In such areas those who wish to have other wildlife on their land may have to sacrifice some of the land's produce or productivity.

Planning for wildlife is already the full-time occupation of an entire division of the Department of Lands and Forests. A District Biologist at Lindsay and a group of Conservation Officers strategically placed through the country provide advice to the average citizen. The present report, based on a short-term examination, deals only with the conditions of the streams for fish and fishing, and with the single problem, improving the farm for wildlife, which is of more general application to a number of land-owners in the region. There is also a section concerning the value for naturalists of retaining at least one area of marsh and lakeshore in its natural state.

The report includes a summary, from reports of various naturalists, of the former and present mammals and birds of the region.

CHAPTER 2

## FORMER AND PRESENT SPECIES

### 1. Former Species

At least seven species of mammals which probably were found in the Central Lake Ontario region at the time of settlement no longer occur in it. These are the marten, fisher, wolverine, timber wolf, black bear, cougar, Canada lynx and the wapiti or American elk. The bobcat or bay lynx might still occur rarely in the northern part of the region. One weighing 25 lbs. was reported in the Orono News in 1926 as having been killed by Cal. Myles near Orono, close to the region. The skin was sold for $25.00*.

Among the birds which were permanent residents the wild turkey may have been found in the watershed. It formerly ranged north at least to Lake Simcoe. The lands near Lake Ontario would probably have been suitable territory, although wild turkeys were much more abundant southward and west of Toronto.

The passenger pigeon, a migrant, is now extinct. Its vast flocks astounded the early settlers. The last large flock of pigeons which were reported flew from west to east across Lot 7, Concession III of Darlington Township in 1865.* Several large colonies had nested in 1856 in Durham County. These birds came "in myriads in August and September to roosts in Darlington Township. All flocks were large, 500 or more." A flock was seen near Enniskillen in 1866. In 1881 near Bowmanville "a stray pigeon or two were about in September." The last sighting reported appears to have been in 1886 by John Townson who wrote "Near Myrtle station, north of Whitby, when the train stopped to take water a male pigeon came to quench his thirst.

---

* Squair, John. "The Townships of Darlington and Clarke", University of Toronto Press 1927.

Other references to the Passenger Pigeon are from:

Mitchell, Margaret H. "The Passenger Pigeon in Ontario", Royal Ontario Museum of Zoology, Toronto 1935.

Then the engine started and I had my last look at a live wild pigeon."* The extinction of this species probably came as much from the clearing of the land as from the intensive market shooting and trapping.

The Bobwhite or Quail was once common in the watershed. The dense forests of Southern Ontario did not provide favourable sites, but Charles Fothergill, writing in 1831, recorded that "Thirty years ago the quail was not known in Canada. Now it abounds in the upper province."† None have been seen recently.

The chief decline in the fish of the region of course concerns the salmon which formerly ascended all the larger streams. The species is now considered to be non-existent in the Great Lakes. The damming of streams for flour mills and sawmills was an important factor in preventing the use of streams by salmon. The early maps show at least five mill-dams near Bowmanville, three on the west branch of Bowmanville Creek and two on the east branch, Soper's Creek. The earliest was built in 1825. Hampton had a dam in 1840 and Tyrone one in 1847. There were doubtless many other dams on the other major streams in the region.

The presence of high dams, the silting of the inshore waters of Lake Ontario, the destruction of spawning beds by great quantities of sawdust and bark, and the intensive commercial fishing by nets and spears, are thought to be the chief causes of the disappearance of the salmon from Lake Ontario and its tributary streams before 1890. The failure of salmon, after intensive introductions in Wilmot Creek in the 1940's, indicates that dams were not the only cause of their disappearance.

---

* Mitchell, Margaret H. "The Passenger Pigeon in Ontario", Royal Ontario Museum of Zoology, Toronto 1935.

† Charles Fothergill, Unpublished Diary 1833, in Royal Ontario Museum, Toronto.

## 2. Present Species

There is a rapidly growing interest in natural history in Ontario. In the area of Greater Toronto which now extends almost to Oshawa, there is a long record of activity in this direction. The natural beauty and relatively wild conditions in the northern part of the watershed attract many people to this area every year. The shore of Lake Ontario is also of exceptional interest because of the great variety of migrating waterfowl and shore birds. The shoreline is also on the migration route of many species of hawks. Lists are therefore included here of all the species of mammals and birds that may be encountered in the region.

### (a) Mammals

The following list of mammals includes a few which have not been collected or observed in the region, but which are probably present, either migratory bats, occasional visitors or active residents. The arrangement and names in the list follow those in the "Provisional Check-List of the Mammals of Ontario", by S. C. Downing*. The most common mammals in the area are probably the meadow mouse and the mole shrew. The white-footed mouse is also a common species.

| | |
|---|---|
| Cinereous Shrew | The Common shrew of the region |
| Smoky Shrew | Probably occurs |
| Water Shrew | Probably occurs in the northern streams |
| Pigmy Shrew | May occur anywhere in the area |
| Mole Shrew | Very common |
| Hairy-tailed Mole | May be present |
| Star-nosed Mole | A common species |
| Little Brown Bat | The common small bat of the region |
| Long-eared Brown Bat | May be present |
| Least Brown Bat | A rare species which may hibernate in this area |
| Silver-haired Bat | Probably common, particularly in migration |
| Pipistrelle | A rare species which may hibernate in the region |
| Big Brown Bat | The common large bat of the region |
| Red Bat | Not a common species, but it may be seen in migration |

---

* Misc. Publication No. 2, Royal Ontario Museum of Zoology, Toronto 1948.

| | |
|---|---|
| Hoary Bat | Not a common species, but it may be seen in migration |
| European Hare | Introduced and now common |
| Varying Hare | A few may be present in the northern part of the region |
| Cottontail | A common species in woodlots and along fencerows |
| Black or Grey Squirrel | Common in hardwood areas |
| Red Squirrel | Common in coniferous areas |
| Groundhog | Very common |
| Eastern Chipmunk | Common in woodlots |
| Eastern Flying Squirrel | Probably present in the southern sections of the region |
| Northern Flying Squirrel | Might occur in the northern part of the region |
| Deer Mouse | The short-tailed form of this species is common in the region |
| White-footed Mouse | Common in wooded areas |
| Bog Lemming | Possibly occurs northward |
| Muskrat | Common in marshy areas |
| Meadow-Mouse | Common throughout the region, with greatly fluctuating populations |
| House Rat | Introduced, commensal with man |
| House Mouse | Introduced, commensal with man |
| Meadow Jumping Mouse | Of regular occurrence |
| Woodland Jumping Mouse | May occur in the northern part of the region |
| Porcupine | May occur in woodlands in the northern part of the region |
| Brush wolf | This small wolf reached Eastern Ontario about 1920. Rarely a brush wolf may enter the northern part of the region |
| Red Fox | Common |
| Raccoon | Common near streams |
| Ermine | Probably occurs throughout the region |
| Long-tailed Weasel | Probably occurs throughout the region |
| Mink | Of general occurrence along the streams of the region |
| Skunk | Common and a valuable check on many insect pests such as the cut-worm |
| White-tailed Deer | Deer have been reported from the wilder sections in the northern part of the region |

(b) Birds

The following list includes those birds which have already been reported in the region.

The list (amounting to 257 species) is based on observations and records by George A. Scott of Oshawa and by J. L. Baillie, Curatorial Assistant, Department of Birds, Division of Life Sciences, Royal Ontario Museum. The arrangement and terminology follow those of the Royal Ontario Museum's Check-List (1958).

A guide to the list follows:

PR = Birds which are considered to be permanent residents
WV = Winter visitors. Many of these species, such as the Old Squaw and Bufflehead, also commonly migrate through the area
A = Very rare or "accidental" records
B = Breeding records available

Species with no letters appended are all migratory. A few of these, such as the Marsh Hawk, may also breed in the region.

Common Loon
Red-throated Loon
Red-necked Grebe
Horned Grebe
A Eared Grebe
A Western Grebe
B Pied-billed Grebe
Double-crested Cormorant
Great Blue Heron
B Green Heron
A Little Blue Heron
Common Egret
A Snowy Egret
Black-crowned Night Heron
B Least Bittern
B American Bittern
A Glossy Ibis
Whistling Swan
Canada Goose
Brant
Snow Goose
Blue Goose
B Mallard
B Black Duck
Gadwall
Pintail
Green-winged Teal
B Blue-winged Teal
European Widgeon
American Widgeon
Shoveler
Wood Duck
Redhead
Ring-necked Duck
Canvasback
WV Greater Scaup
WV Lesser Scaup
WV Common Goldeneye
WV Bufflehead
WV Oldsquaw
King Eider
White-winged Scoter
Surf Scoter
Ruddy Duck
Hooded Merganser
WV Common Merganser
Red-breasted Merganser
Turkey Vulture
WV Goshawk
Sharp-shinned Hawk
B Cooper's Hawk
B Red-tailed Hawk
B Red-shouldered Hawk
Broad-winged Hawk
Rough-legged Hawk
Bald Eagle
Marsh Hawk
Osprey
A Gyrfalcon
Peregrine Falcon
Pigeon Hawk
PRB Sparrow Hawk
PRB Ruffed Grouse
PRB Ring-necked Pheasant
Gray Partridge
A Sandhill Crane
B Virginia Rail
B Sora
B Common Gallinule
B American Coot
Semipalmated Plover
B Killdeer
American Golden Plover
Black-bellied Plover
Ruddy Turnstone
B American Woodcock
B Common Snipe
Whimbrel
B Upland Plover
B Spotted Sandpiper
Solitary Sandpiper
Greater Yellowlegs
Lesser Yellowlegs
Knot
Purple Sandpiper
Pectoral Sandpiper
White-rumped Sandpiper
Baird's Sandpiper
Least Sandpiper
Dunlin
Short-billed Dowitcher
Stilt Sandpiper
Semipalmated Sandpiper
Marbled Godwit
Hudsonian Godwit
Sanderling
Red Phalarope
Wilson's Phalarope
Northern Phalarope
Glaucous Gull
Iceland Gull
WV Great Black-backed Gull
Herring Gull

| | |
|---|---|
| | Ring-billed Gull |
| | Laughing Gull |
| | Bonaparte's Gull |
| | Little Gull |
| A | Forster's Tern |
| | Common Tern |
| | Caspian Tern |
| B | Black Tern |
| A | Razorbill |
| | Thick-billed Murre |
| A | Dovekie |
| PR | Rock Dove |
| B | Mourning Dove |
| B | Yellow-billed Cuckoo |
| B | Black-billed Cuckoo |
| | Barn Owl |
| PR | Screech Owl |
| PRB | Great Horned Owl |
| | Snowy Owl |
| PR | Barred Owl |
| PR | Long-eared Owl |
| PR | Short-eared Owl |
| PR | Saw-whet Owl |
| B | Whip-poor-will |
| B | Common Nighthawk |
| B | Chimney Swift |
| B | Ruby-throated Hummingbird |
| B | Belted Kingfisher |
| B | Yellow-shafted Flicker |
| PRB | Pileated Woodpecker |
| B | Red-headed Woodpecker |
| | Yellow-bellied Sapsucker |
| PRB | Hairy Woodpecker |
| PRB | Downy Woodpecker |
| WV | Black-backed Three-toed Woodpecker |
| B | Eastern Kingbird |
| B | Great Crested Flycatcher |
| B | Eastern Phoebe |
| | Yellow-bellied Flycatcher |
| B | Traill's Flycatcher |
| | Least Flycatcher |
| B | Eastern Wood Pewee |
| | Olive-sided Flycatcher |
| B | Horned Lark |
| B | Tree Swallow |
| B | Bank Swallow |
| B | Rough-winged Swallow |
| B | Barn Swallow |
| B | Cliff Swallow |
| B | Purple Martin |
| PRB | Blue Jay |
| B | Common Crow |
| PRB | Black-capped Chickadee |
| WV | Boreal Chickadee |
| PRB | White-breasted Nuthatch |
| PRB | Red-breasted Nuthatch |
| PR | Brown Creeper |
| B | House Wren |
| | Winter Wren |
| | Carolina Wren |
| B | Long-billed Marsh Wren |
| B | Short-billed Marsh Wren |
| B | Catbird |
| B | Brown Thrasher |
| B | Robin |
| B | Wood Thrush |
| | Hermit Thrush |
| | Swainson's Thrush |
| | Gray-cheeked Thrush |
| B | Veery |
| B | Eastern Bluebird |
| B | Blue-gray Gnatcatcher |
| PR | Golden-crowned Kinglet |
| | Ruby-crowned Kinglet |
| | Water Pipit |
| PRB | Cedar Waxwing |
| WV | Northern Shrike |
| B | Loggerhead Shrike |
| PRB | Starling |
| | Yellow-throated Vireo |
| | Solitary Vireo |
| B | Red-eyed Vireo |
| | Philadelphia Vireo |
| B | Warbling Vireo |
| B | Black-and-white Warbler |
| | Golden-winged Warbler |
| | Tennessee Warbler |
| | Orange-crowned Warbler |
| | Nashville Warbler |
| | Parula Warbler |
| B | Yellow Warbler |
| | Magnolia Warbler |
| | Cape May Warbler |
| | Black-throated Blue Warbler |
| | Myrtle Warbler |
| | Black-throated Green Warbler |
| | Cerulean Warbler |
| | Blackburnian Warbler |
| | Chestnut-sided Warbler |
| | Bay-breasted Warbler |
| | Blackpoll Warbler |
| | Pine Warbler |
| | Prairie Warbler |
| | Palm Warbler |
| B | Ovenbird |
| B | Northern Waterthrush |
| | Connecticut Warbler |
| B | Mourning Warbler |
| B | Yellowthroat |
| | Yellow-breasted Chat |
| | Hooded Warbler |
| | Wilson's Warbler |
| | Canada Warbler |
| B | American Redstart |
| PRB | House Sparrow |
| B | Bobolink |
| B | Eastern Meadowlark |
| B | Western Meadowlark |
| B | Redwinged Blackbird |
| B | Baltimore Oriole |
| | Rusty Blackbird |
| B | Common Grackle |
| B | Brown-headed Cowbird |
| B | Scarlet Tanager |
| PRB | Cardinal |
| B | Rose-breasted Grosbeak |
| B | Indigo Bunting |
| WV | Evening Grosbeak |
| PR | Purple Finch |
| WV | Pine Grosbeak |
| | Hoary Redpoll |
| WV | Common Redpoll |
| WV | Pine Siskin |
| PRB | American Goldfinch |

| | | | |
|---|---|---|---|
| B | Rufous-sided Towhee | B | Clay-colored Sparrow |
| B | Savannah Sparrow | | Field Sparrow |
| B | Grasshopper Sparrow | | White-crowned Sparrow |
| B | Henslow's Sparrow | B | White-throated Sparrow |
| | Sharp-tailed Sparrow | | Fox Sparrow |
| B | Vesper Sparrow | | Lincoln's Sparrow |
| PR | Slate-colored Junco | B | Swamp Sparrow |
| WV | Oregon Junco | B | Song Sparrow |
| WV | Tree Sparrow | | Lapland Longspur |
| B | Chipping Sparrow | WV | Snow Bunting |

## CHAPTER 3

## IMPROVING THE LAND FOR WILDLIFE

There is a very great variation in the soils, topography and vegetation of this region. The requirements of food and cover vary greatly for different species of wildlife. Landowners also differ in what species of wildlife they wish to see on their land. Many wish to see some game species, but do not wish to hunt them. It is probably a safe assumption that more than 50 per cent of the landowners are not interested in hunting or in increasing the number and kinds of game species on their property. There are of course many who are interested in the variety of wild birds seen. There is a steadily growing interest in natural history in Ontario, particularly near Oshawa and Toronto. The following remarks, therefore, apply to those whose lands include steeply-sloping or swampy land, and to all who wish to improve the carrying capacity of the land for wildlife.

### 1. Woodlands

Approximately 10 per cent of the land remains in woodlots. The elimination of grazing in these woodlots would be the most useful single measure in improving the wildlife environment.

In young plantations on grassy land the entire planted area is valuable for wildlife. But large blocks of coniferous trees will, at least after about the twelfth year from planting, have little or no undergrowth and will, apart from their edges or fire-breaks in them, be relatively sterile as far as upland game and most forms of wildlife are concerned. The chief improvements to be expected will therefore come from good management of the farm woodlot. In mixed woodlands selective cutting is both sound forestry practice and good planning for wildlife. Landowners who have woodlots in which the crown canopy has closed over considerable areas and who wish to produce a proper environment for wildlife will find that release cuttings, slashings to

stimulate sprout growth, thinnings and felling timber for sale will improve rather than retard the carrying capacity for wildlife. Construction of brush piles from cuttings is recommended where cottontail rabbits are desired, two or three such brush-piles per acre being the normal spacing.

2. Cultivation Practices

All good farming practices which make a more luxuriant vegetation will improve the farm environment for wildlife. A few special practices will give more specific benefits. Strip-cropping is of particular value, since by this means no extensive area is denuded of cover at one time by harvesting. Grassed waterways provide travel-lanes and nesting-cover for wildlife. Cover crops such as Hairy Vetch provide a habitat and food for wildlife in areas that would otherwise be barren during the winter months.

The elimination of brushy fencerows is now becoming more common in the Central Lake Ontario region. Those who are interested in wildlife improvement will find that the inclusion of a few field boundary hedges on the farm will moderate the effect of winds on crops, serve as travel-lanes and cover for wildlife and harbour large numbers of song birds which may help to control insect pests. Inevitably the presence of boundary hedges on a farm tends to encourage the growth of weeds. This is the price that must be paid for improved wildlife conditions in farmland.

The following are a few species of plants which are of particular value as food or cover for wildlife.

Rosa multiflora - Is an excellent hedge-forming shrub. It has a tendency, in Southern Ontario, to die back in winter but rapidly forms a dense hedge, which is reported to be proof against cattle and hogs. It provides both cover and food and does not exhaust the nearby cultivated ground. The hardiness of some varieties is questionable. It might therefore be wise to propagate this species by vegetative means from individual plants

that have already been planted and found to be hardy in the Central Lake Ontario region. It should be remembered that plants which are hardy near Lake Ontario may not be hardy in the upper sections of the region.

Hairy Vetch - Can be grown on poor, sandy soil, and overwinters well. Cottontails and the European Hare use it for food and cover. The seeds are eaten by a great many of the ground-feeding birds.

Corn - A few rows of uncut corn standing in a field or garden will provide excellent cover and a continual supply of food for the larger birds, including the Hungarian Partridge, if this species is introduced into the region. Cracked corn is useful for smaller birds. Corn left near streams will almost certainly be removed and eaten by raccoons.

Buckwheat - This common crop plant is chiefly grown for its abundant seed which is mixed in with other seeds in feed mixtures. The seeds have a high fat content, while the rest of the plant is commonly ploughed under, particularly to increase the soil nitrogen. Much of the seed drops off into the stubble, and buckwheat stubble is a favoured feeding ground for almost all birds.

* Elderberry - A great many species of birds feed on the small, black, juicy berries, and there are not often many of the fruits left in winter. However, the birds, once attracted, will return to feed on other fruits.

* Highbush Cranberry - This shrub is strongly recommended, and grows as a native species in this area.

European Millet - The abundance of seeds attracts vast numbers of birds. It is grown commercially for bird seed.

* Wild Grape - Provides excellent wildlife food and cover, but it forms such a dense tangle over fences and young trees that it should only be planted where it can be carefully watched and controlled.

---

* Species marked with a star can usually be found growing on some part of every farm.

There are many other plants that could be recommended for use as cover, food or nesting sites in gardens. The best general reference book on this subject, for birds of this area, is "Planting Your Garden for Wild Birds" by James R. Mackintosh, published by the Audubon Society of Canada, 181 Jarvis Street, Toronto, Ontario.

3. Ponds and Streams

The importance of water to wildlife is often forgotten. Many farms have at least one low spot where a small amount of work with a scoop will create a dam and a pond to provide nesting and feeding sites for water and marsh birds. If possible, ponds for wildlife should be separate from those intended for cattle or for fish. Willow cuttings, preferably shrub species rather than tree species, can be pushed in the ground around such a hollow, and will rapidly provide wildlife cover. New water areas are usually very rapidly invaded by aquatic plants, but additional species may have to be introduced. No extensive duck food studies have been made in Southern Ontario. Wild rice may be introduced, but since it is not well adapted to wide variations in water levels during its growing season, being often sterile in fluctuating waters, it cannot be considered as certain to succeed. The seed must be kept wet from the time it is harvested until it is sown (or broadcast) on the water surface. The idea has long been current, and fostered by many sportsmen's organizations, that the growing of wild rice is the answer to the problem of how to attract ducks to any area. Wild rice is actually of little significance to ducks in Canada except in the fall, and does not provide good cover or nesting sites.

The following species, which may be easily obtained, are recommended as certain to be valuable duck foods. If none of them occur in ponds or shallows with good cover for ducks, they can be introduced. All of them are hardy in Southern Ontario.

| | |
|---|---|
| Sago Pondweed | Potamogeton pectinatus L. |
| Red-Head Pondweed | Potamogeton Richardsonii (Ar. Benn.) Rydb. |
| Wild Millet | Echinochloa crusgalli (L) Beauv. |
| Japanese Millet | Echinochloa frumentacea (Roxb) Link |
| Wild Celery | Vallisneria americana Michx. |
| Knotweed | Polygonum pensylvanicum L. |
| Water-Smartweed | Polygonum coccineum Muhl. |
| Three-square | Scirpus americanus Pers. |
| Great Bulrush | Scirpus validus Vahl., var. creber Fern |
| Duckweed | Spirodela sp. and Lemna sp. |

Those who are interested in farm ponds for wildlife will find very useful details of the various types of ponds and methods for constructing each type in a booklet, "Farm Ponds", which is available from the Provincial Department of Agriculture.* Farm ponds differ from those intended for wildlife in that care is usually taken to prevent the growth of aquatic vegetation in a farm pond intended only for watering stock or fire protection purposes. Otherwise, the construction and details of ponds for wildlife should follow one of the types there described.

Algae in ponds are often only present for a short time and will disappear in a month or so. A concentration of 0.5 p.p.m. of copper sulphate will destroy them temporarily at least. The larger aquatic vegetation, if too abundant, cannot be removed except by cutting (a heavy chain is useful), by draining the pond or by the use of 2,4-D for emergent vegetation or poisonous compounds such as sodium arsenite for submerged plants. These compounds will of course kill fish also, and the use of this method requires permission from the Provincial Department of Lands and Forests and the Water Resources Commission of Ontario if the treated water flows into any other privately owned or public waters.

---

* Applications may be made to the nearest Provincial Agricultural Representative or to the Department of Agriculture, Parliament Buildings, Toronto.

CHAPTER 4

# FISH

## 1. Introduction

Stream surveys in the Central Lake Ontario region in 1959 were restricted to four kinds of work. These were as follows:

(a) A general classification of the waters defining the suitability of the various parts for different species of fish.

(b) An examination of the gross pollution of the major creeks.

(c) A general examination of Chalk Lake was made.

(d) A few areas which appeared particularly suitable for demonstrations of stream improvement were mapped.

## 2. Methods

The procedure adopted followed closely that used in previous surveys made by the Department of Planning and Development in other river systems. The streams were visited at 193 stations from half a mile to three miles apart on each stream course. The topography of the valley and the erosion, vegetation, volume of flow, turbidity, temperature and type of bottom were listed for each station. At all suitable stations collections of the aquatic insects and other invertebrates were made. At most of the stations collections of fish were also made. The collections were classified and used in zoning the various sections of the river, as shown on the accompanying maps.

Some of the mayflies, stoneflies and caddisflies were particularly useful since many are reliable indicators of the stream conditions at the time of year most critical for fish life. Various species are indicators of cold, cool, warm and permanent water. Thus the potentialities of a stream for particular species of fish are indicated. Seven maximum-minimum thermometers and two continuous recording thermometers were installed at critical points in the river. Readings from the maximum-minimum recording thermometers were taken at least once in

each week. The fish collections helped to substantiate the findings made from thermometer readings and insect collections. However the collection of fingerling trout is not always an indication of suitable water for trout, as these may be introduced into streams which later reach lethal temperatures.

Many of the present criteria and methods were developed from more intensive year-round research carried out by Dr. F. P. Ide* of the Department of Zoology, University of Toronto, on many streams in Ontario. The analysis by J. C. Hallam† of previous river surveys made by the Department of Planning and Development was also found extremely useful.

The streams were examined between May 20th and June 30th, and many of them were examined only once. The flow of the river was certainly above the normal minimum summer flow. It was therefore necessary to rely extensively on deductions made from the presence or absence of species known to be reliable indicators.

3. The Stream Courses

The general structure of each of the major stream valleys is similar. In each case the northern springs originate at or below the edge of the "kame" area of gravelly and sandy

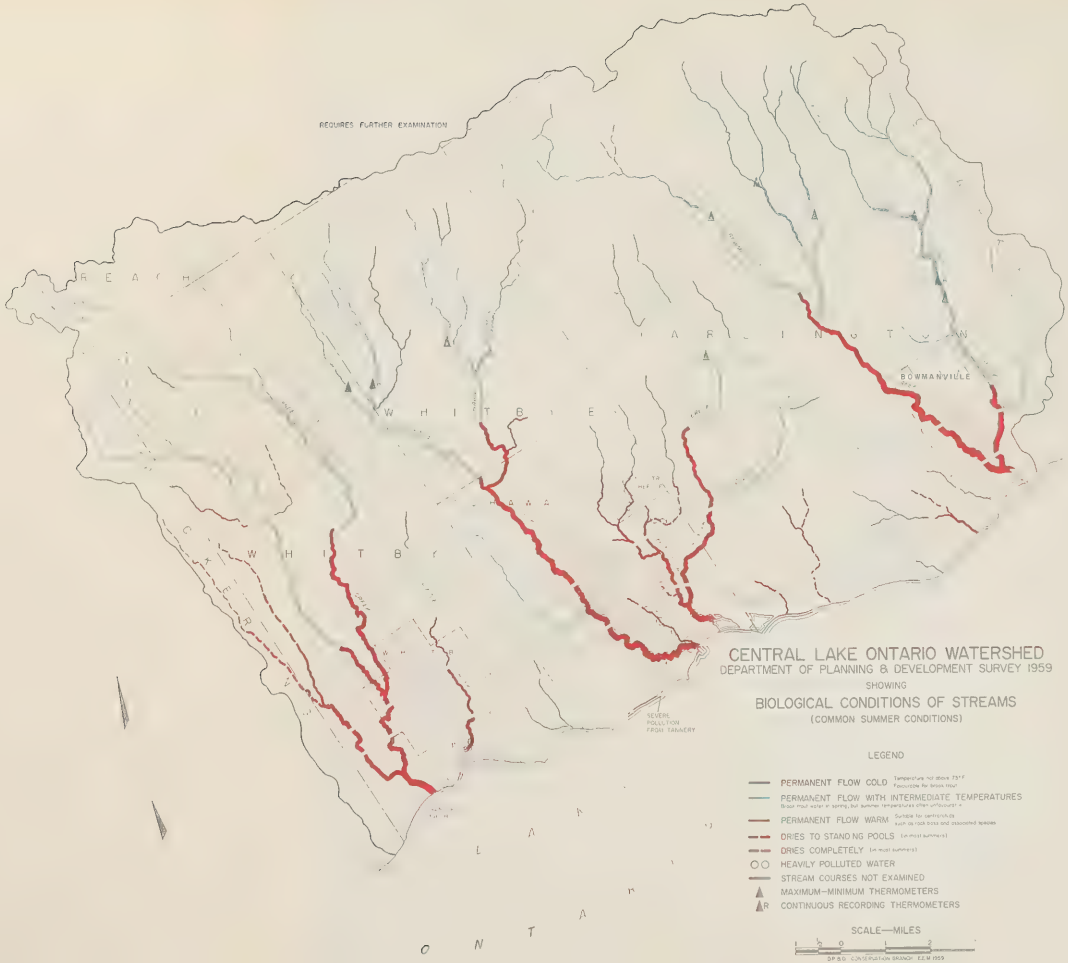
---

* Ide, F. P. The Effect of Temperature on the Distribution of the Mayfly Fauna of a Stream. University of Toronto Studies, Biology 39, Ontario Fisheries Research Laboratory, Publication 50, 1935.

Ide, F. P. Quantitative Determination of the Insect Fauna of Rapid Water. University of Toronto Studies, Biology 47, Ontario Fisheries Research Laboratory, Publication 59, 1940.

Sprules, W. M. An Ecological Investigation of Stream Insects in Algonquin Park, Ontario. University of Toronto Studies, Biology 56, Ontario Fisheries Research Laboratory Publication 69, 1947.

† Hallam, J. C. Habitat and Associated Fauna of Selected Species of Fish in Ontario Streams. M. A. Thesis, University of Toronto, 1954.


REQUIRES FURTHER EXAMINATION
BOWMANVILLE
SEVERE POLLUTION FROM TANNERY
CENTRAL LAKE ONTARIO WATERSHED
DEPARTMENT OF PLANNING & DEVELOPMENT SURVEY 1959
SHOWING
BIOLOGICAL CONDITIONS OF STREAMS
(COMMON SUMMER CONDITIONS)
LEGEND
PERMANENT FLOW COLD Temperature not above 73°F Favourable for brook trout
PERMANENT FLOW WITH INTERMEDIATE TEMPERATURES Brook trout exist in spring, but summer temperatures often unfavourable
PERMANENT FLOW WARM Suitable for warmwater fish as rock bass and associated species
DRIES TO STANDING POOLS (in most summers)
DRIES COMPLETELY (in most summers)
HEAVILY POLLUTED WATER
STREAM COURSES NOT EXAMINED
MAXIMUM–MINIMUM THERMOMETERS
CONTINUOUS RECORDING THERMOMETERS
SCALE—MILES
1/2 0 1 2
DP&D CONSERVATION BRANCH E.E.M. 1959

stratified soils which extends from the vicinity of Raglan eastward along the northern edge of the region. These streams pass through an extensive section of till plain. They then cross the shore lines of former Lake Iroquois with their attendant sand plains in the neighbourhood of Kinsale, Brooklin, Taunton, and Tyrone and finally pass through the gentle slopes of the clay plain near their outlets into Lake Ontario. There are several marshes along the shore line, of which most are protected from the lake by sand-bars.

4. Permanence of Flow and Temperature Conditions

The permanence of flow of the river and its tributaries is shown on the accompanying map "Biological Conditions of Streams". The permanence was based on the presence or absence of certain insect larvae which are not found except where there is permanent flow. The genus used was Hydropsyche, one of the caddisflies. The conditions shown are applicable in any year of relatively normal precipitation and temperature. Very exceptional weather conditions would, of course, change the stream conditions. The climatic conditions in the Central Lake Ontario region were not very unusual in the summer of 1959. Precipitation was a little below average in a strip along the shore but in the rest of the watershed was very close to the average recorded rainfall. However, the August temperatures were exceptionally high. These of course did not affect the survey since the survey was completed at the beginning of July.

The summer temperature conditions affecting fish are shown on the accompanying map. Adult brook trout should thrive best in the lower parts of the sections coloured blue. The greatest daily fluctuations in temperature are found in the sections coloured green. Brook trout may inhabit some of the green sections, particularly the upper parts in early or late summer but may move out or be killed in the warmest days of midsummer. Brown trout appear to adapt themselves better to the higher temperatures in these sections, i.e., they thrive in

slightly warmer water than the optimum water for brook trout, but both species have approximately the same lethal or killing temperature (depending on the temperature range to which they have been acclimatized).

5. Fish Distribution

The following thirty-two species of fish were found in the rivers and streams of the watershed during the survey of 1959.

PETROMYZONIDAE - lampreys

*Sea lamprey
American brook lamprey

CLUPEIDAE - herrings

Alewife

SALMONIDAE - salmons and trouts

*Brown trout
*Rainbow trout
*Brook trout

CATOSTOMIDAE - suckers

*White sucker

CYPRINIDAE - minnows

Golden shiner
*Creek chub
Redside dace
Northern redbelly dace
Finescale dace
Blacknose dace
Longnose dace
Common shiner
Spotfin shiner
Bluntnose minnow
Fathead minnow

AMEIURIDAE - catfishes

*Brown bullhead

---

* Species which may be familiar to the angler are starred.

The naming or terminology in the list is that approved in February, 1957, by W. B. Scott, Ph.D., Curator of Ichthyology and Herpetology, Royal Ontario Museum, Toronto.

ESOCIDAE - Pikes

*Northern pike

SERRANIDAE - basses

*White bass

CENTRARCHIDAE - sunfishes

*Smallmouth bass
*Rock bass

PERCIDAE - perches

Yellow perch

Subfamily - Etheostomatinae - darters

Logperch
Johnny darter
Rainbow darter
Iowa darter

COTTIDAE - sculpins

Mottled sculpin
Slimy sculpin

GASTEROSTEIDAE - sticklebacks

Brook stickleback
Threespine stickleback

The distribution of the major game species and some associated ones based on the 1959 collections is shown on the accompanying map. The map is not intended to give any estimate of the relative numbers or of the locations where fish of acceptable length for angling will be found. Further collecting would increase the known range of some of the species, and also would add several additional species including probably the northern redhorse, the hogsucker, the carp and several others.

---

* Species which may be familiar to the angler are starred.

The naming or terminology in the list is that approved in February, 1957, by W. B. Scott, Ph.D., Curator of Ichthyology and Herpetology, Royal Ontario Museum, Toronto.


# BIOLOGICAL COLLECTION STATIONS

## FROM THE 1959 SURVEY

SCALE 1 1/2 0 1 2 3 MILES

D.P.B.D. CONSERVATION BRANCH B.A.E.


DISTRIBUTION OF

# GAME FISH

## AND SOME ASSOCIATED SPECIES

FROM THE 1959 COLLECTIONS

LEGEND

- BROOK TROUT
- BROWN TROUT
- RAINBOW TROUT
- MUDDLERS (COTTUS COGNATUS) (AN INDICATOR OF BROOK TROUT WATER)

SCALE — MILES

1 ½ 0 1 2 3

D.P.&D. CONSERVATION BRANCH E.E.M. 1959

Brook trout were extremely common in most of the streams in the northern parts of the watershed. In many of the uppermost sections of the streams brook trout were in fact the only species of fish present. The upper branches of Bowmanville Creek and Soper Creek appear to have the largest populations of brook trout. Brook trout of large size, ten inches and over, are not common in these streams, either because the streams are heavily fished or because almost all of the streams have a small flow and a steep gradient, with temperatures rather lower than would support a rapid growth rate. Brown trout were present at seven of the stations and rainbow trout at two of them. Small-mouth bass were found only on Lynde Creek below No. 2 Highway. Sea lampreys were found only in the adult stage at stations CAla10 and CAlall, also on Lynde Creek. No electrical device was used for checking the numbers of sea lamprey ammocoetes, and it is probable that they occur also in many other streams in the watershed, particularly in Bowmanville and Soper Creeks. Northern pike were found only in Lynde Creek and Oshawa Creek, but this species is difficult to catch by seining and is probably more widely distributed near the mouths of the streams in sluggish water. Yellow perch were found at only four stations.

The remaining twenty-five species are chiefly small minnows and darters of little interest to anglers except as forage fish. Four of these are much more widespread in the watershed and also more abundant than all the others. These are in order of abundance the blacknose dace, the creek chub, the white sucker and the common shiner.

## 6. Pollution

The responsibility for the control of pollution in Ontario now rests with the Ontario Water Resources Commission, which also carries out an extensive program of investigation of suspected sources of pollution. However, Conservation Authorities are very much interested also in this problem because they can

often draw the attention of the Water Resources Commission to suspected sources, and can also carry out extremely useful programs in public relations aimed at reducing pollution. Several Conservation Authorities have established Water and Pollution Advisory Boards, and these have already proved of great value.

(a) General Effects

Pollution effects are of two kinds: those affecting public health and those which are not a hazard to human health but which are offensive to people or harmful to stock or to fish and other aquatic organisms. The first type can usually be measured by the concentration of an indicator organism (the bacillus E. coli.). The second type is measured in terms of poisonous compounds which may be introduced into the river and in terms of oxygen depletion and the oxygen demand (B.O.D.)*. Silting has additional effects. Shifting sand bottoms are virtual aquatic deserts.† Colloidal clay prevents light penetration and retards the growth of aquatic organisms, making the water unsightly and undesirable for swimming. Silt from land of good fertility may occasionally fertilize the water, producing an unsightly growth of algae. More often silt covers the normal bottom fauna and destroys the stream for fish.

The commonest type of pollution is that caused by the discharge of wastes containing dissolved or suspended organic compounds. Domestic sewage and most industrial wastes are predominantly of this type. Certain bacteria and other organisms

---

* The B.O.D., or Biochemical Oxygen Demand, is a measure of the oxygen that will be demanded by the material in the course of its complete oxidation biochemically. It is determined wholly by the availability of the material as a bacterial food and by the amount of oxygen utilized by the bacteria during its oxidation.

† Tarswell, C. M. and Gaufin, A. R., "Some Important Biological Effects of Pollution Often Disregarded in Stream Surveys". Proceedings of the 8th Industrial Waste Conference, 1953, Purdue University, U.S.A.

cause the decomposition of these organic compounds by consuming the organic solids and combining them with oxygen. The resulting shortage of oxygen in the water is one of the chief symptoms of a polluted stream.

Aerobic decomposition of organic compounds in water, (i.e., in the presence of ample dissolved oxygen). finally results in the formation of compounds such as carbon dioxide, water, nitrates and sulphates.* Being comparatively stable, they exert no further demand for oxygen, produce no foul odours, and do not cause septic conditions in the water. They do, however, fertilize the water and stimulate the growth of plant and animal life in the stream. Dense growths of green algae are normally a sign that the stream is recovering from organic pollution.

In the absence of dissolved oxygen in the water "anaerobic decomposition" of organic wastes takes place. Oxygen is then consumed from the organic materials and compounds remain such as methane gas, hydrogen sulphide gas, ammonia and others having little or no oxygen. Many of these products have highly disagreeable odours typical of polluted waters. Sometimes the decomposition products are lethal to fish and other aquatic organisms, but more often these die from lack of oxygen.

Since the amount of oxygen water can dissolve is so small†, sewage treatment facilities should be designed to turn out an effluent that is already decomposed biologically, so that the stream's oxygen reserves will not be called upon to an appreciable degree for this purpose.

Apart from bacterial pollution the types and abundance of both plant and animal species in a stream provide an

---

* Proper treatment of sewage wastes should include two phases, primary treatment (mechanical removal of most solids) and secondary treatment (digestion of the remainder by aerobic decomposition, as here described).

† Less than 20 parts of oxygen per million parts of water by weight.

excellent measure of the condition of the water. At the one extreme severely-polluted waters may contain extensive growths of gray-brown fungi, vast numbers of scavenger types of bottom-feeding organisms, a great bacterial population (or a sterile condition), and little or no dissolved oxygen. At the other end of the scale clean waters will support green algae, insect larvae, snails, clams, game fish and other organisms requiring abundant oxygen.

The time and distance required for recovery of a polluted stream depend on many factors, such as the temperature and volume of flow of the water, the type of pollutant at the polluting effluent, the type of stream bed and types of obstructions such as dams.

(b) Conditions on the River Courses

The following report, as it concerns the two streams, Oshawa Creek and Harmony Creek, is based on the findings of the Ontario Water Resources Commission.* Concerning other sections of the watershed it is based on observations made during the biological survey in 1959 by the Department of Planning and Development. During the latter's survey no bacterial tests or tests of the oxygen content of the water were made. Describing the streams in order from west to east, the first stream is Lynde Creek. The stream was examined at stations CA6 and 7 at Brooklin. Brooklin has no sanitary sewers. The only openings into the creek are 4 storm sewers, one at Meadowcrest Subdivision north-west of the town, 2 at the crossing of Highway 7 and 12 in Brooklin, and one near the Township Offices in Brooklin. These do not seem to be a constant source of pollution. A few private outlets lead into the river. For example, a 1" plastic hose with foot-valve was found at Brooklin. Both agricultural and recreational use increase the turbidity of the stream. Prevention of this turbidity would include the fencing of pastures from cattle and the building

---

* Report on Oshawa Creek Survey and Harmony Creek Survey, Ontario Water Resources Commission, 1958.

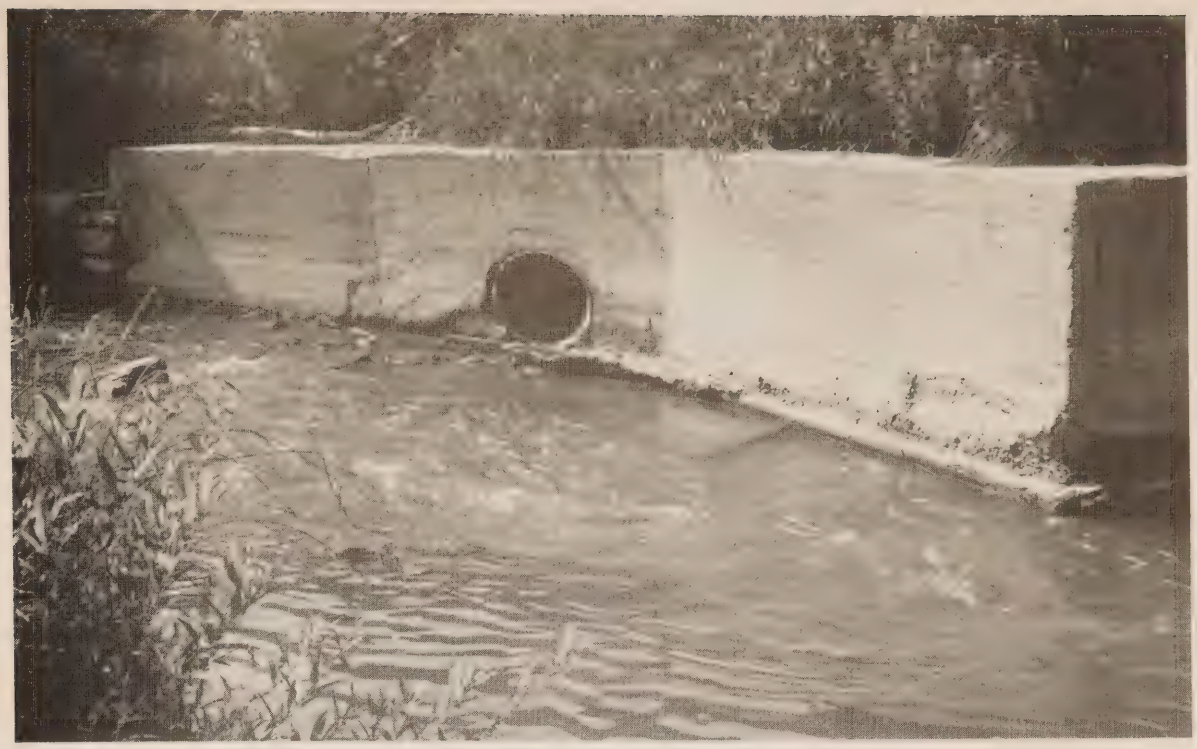
of a deeper and larger swimming pool. The water of Lynde Creek from No. 2 Highway to Lake Ontario was similarly checked. It is muddy but no sewers from the town empty into it, and agricultural pollution is assumed to be the sole cause of turbidity. Irrigation is carried on just above this point and run-off to the streams probably increases the load carried. The stream water between Brooklin and Whitby is used in at least 2 parks for swimming pools. After chlorination this water is released back into the stream and may affect the waters for a short distance downstream. The Whitby Sewage Treatment Plant is located just south of Highway No. 401 on Pringle Creek. The water below this plant appeared to be extremely foul.

Oshawa Creek was examined in the fall of 1958 by personnel of the Ontario Water Resources Commission.* Samples were taken from a large number of points. The report on this examination indicates that industrial wastes and sanitary wastes which are discharged to Oshawa Creek from a leather company south of No. 2 Highway adversely affect the quality of the water in the stream beyond reasonable limits. Seven municipal storm drains which have their outfall to the waters of Oshawa Creek or its tributaries included contaminating wastes. It is recommended in the Water Resources Commission's report that appropriate measures be undertaken by the leather company either to exclude all of the their sanitary and contaminated industrial wastes from Oshawa Creek or to provide adequate treatment for these wastes. It is also recommended that the City of Oshawa should undertake a program to eliminate all sanitary sewage and contaminating industrial waste from the storm drains which discharge to Oshawa Creek. "This is a complex problem and will involve considerable local effort".

The exact results of the above survey in five-day B.O.D. and the coliform counts per 100 ml. are contained in the Water Resources Commission's Report. The centre outfall to the

---

* Report on Oshawa Creek Survey and Harmony Creek Survey, Ontario Water Resources Commission, 1958.



Oshawa Creek is heavily polluted by these outlets.

Pringle Creek, showing the effect of heavy fertilization of aquatic plants from pollution.

Cattle pollute some of the streams and also destroy the stream banks, thus increasing erosion.

creek from the leather company had a 5-day B.O.D., when examined, of 362.0 and the south outfall to the creek from the leather company's plant had a coliform count of 100,000 which does not compare favourably with the maximum allowable count of 2,400. Several of the storm drains in Oshawa had coliform counts varying from 20,000 to 150,000 and also had 5-day B.O.D.s up to 71.0. It is thus clear that there is room for a great deal of improvement on Oshawa Creek.

Harmony Creek* which passes through the eastern side of Oshawa is polluted beyond reasonable limits at at least five points. Industrial wastes are discharged into the creek from a printing company close to No. 2 Highway and at this point there are toxic chemical wastes (including cyanides) as well as a high 5-day B.O.D. Household wastes enter a municipal storm drain near Robert Street and Grierson Street in Oshawa. There are toxic chemical wastes in Dean Avenue Creek which discharges to Harmony Creek south of Bloor Street East in Oshawa. South-east of Oshawa the Oshawa Sewage Treatment Plant discharges wastes into Harmony Creek near Lake Ontario. It is recommended in the Water Resources Commission's Report that the present expansion of the Oshawa Sewage Treatment Plant should be continued to ensure that the capacity and efficiency keep pace with the increasing sewage loads and industrial wastes. Revision in the methods of treatment and disposal of the industrial wastes and sewage from the printing company are urged in the report. It is also recommended in the report that the City of Oshawa should undertake a program to exclude all sanitary and contaminated industrial wastes from storm drains which have their outfall in Harmony Creek. An industrial and garbage disposal company dumps refuse on a large tract of land north-east of Oshawa, on Harmony Creek. Oil from this disposal site was observed both in the Water Resources Commission's examination and also at the time of the biological survey by the Department of Planning and Development. It is recommended that the

---

* Report on Oshawa Creek Survey and Harmony Creek Survey, Ontario Water Resources Commission, 1958.

These structures do not create sufficient depth. Large boulders should have been used.

A trout stream which could easily be improved by digger logs or small dams.

The Cranberry Marsh is worth preserving for the great numbers of interesting birds which it harbours.

company should ensure that there is no seepage into Harmony Creek or its tributaries from this disposal site.

Bowmanville Creek was also checked for possible sources of gross pollution. There was gradually increasing turbidity at the lower stations but no indicator species of pollution were found even at Port Darlington, where there are boat docks all along the shore.

7. Stream Improvement

In the Central Lake Ontario Region there are so many streams with lengthy sections suitable for brook trout that there is already heavy fishing pressure on them from the expanding population in the southern areas. Many streams are already posted, and the farmers have now the opportunity either of improving the stream conditions for themselves or of improving conditions and charging a daily fee for the use of the stream for fishing, as has already occurred both in this watershed and in many other parts of the province.

There are in fact relatively few streams remaining in the whole agricultural sector of Southern Ontario which could not be altered to improve the habitat for fish. Almost all of the streams in the Central Lake Ontario Region are shallow and there is relatively little good fish cover. This is understandable in the steeply-sloping streams in young narrow eroding valleys in the northern sandy area, but elsewhere there is certainly room for improvement. This condition results from three causes: (1) The running of logs down streams and the consequent removal of logs and cover. (2) The clearing of land to the water's edge in the interests of agriculture. (3) The erosion of banks and the silting of stream bottoms, particularly during and after heavy floods.

Many of the old ponded areas behind old grist mill or sawmill dams have also disappeared. The few that remain, although silted, provide excellent fishing, but most of these are posted against public fishing.

There are of course a great many sections of stream which were not close to the biological collection stations, and which were therefore not examined, but which can be improved. Those areas of stream which were examined and to which reference is here made, can be located on the map "Biological Collection Stations", included in this report.

A good habitat for brook trout or brown trout should include the following features: Deep holes; rapids or aquatic vegetation, both of which harbour large numbers of insect larvae; submerged logs, boulders and roots for cover, and if possible a section of stream which cannot be fished, so that there will always be mature fish of both sexes available to spawn in season and thus to keep the population at a reasonable level. If such a condition is to be reached the stream banks must be protected from excessive erosion. The use of the current to dig holes during periods of high flow is presumed to be a necessity. Where holes are dug with a bulldozer much of the stream is often so affected that it may remain unproductive for a year or more.

The following areas in the Central Lake Ontario Region are a few of those in which one or more forms of stream improvement could be easily carried out.

Oshawa Creek one mile east of Columbus.

The creek which passes through Haydon in Darlington Township, one mile below the village.

The same creek in the southern part of Lot 14, Concession VI, Darlington Township.

The same creek in Lot 16, Concession IV, Darlington Township.

The branch of Soper Brook in Lot 3, Concessions VI and VII, Darlington Township.

The eastern tributary of Soper Brook in Lots 2 and 3, Concession VI, Darlington Township.

Soper Brook in Lot 6, Concession IV, Darlington Township.

The most useful device is probably a digger log well anchored in the banks. Some of the accompanying photographs show various devices which have been used successfully by residents of

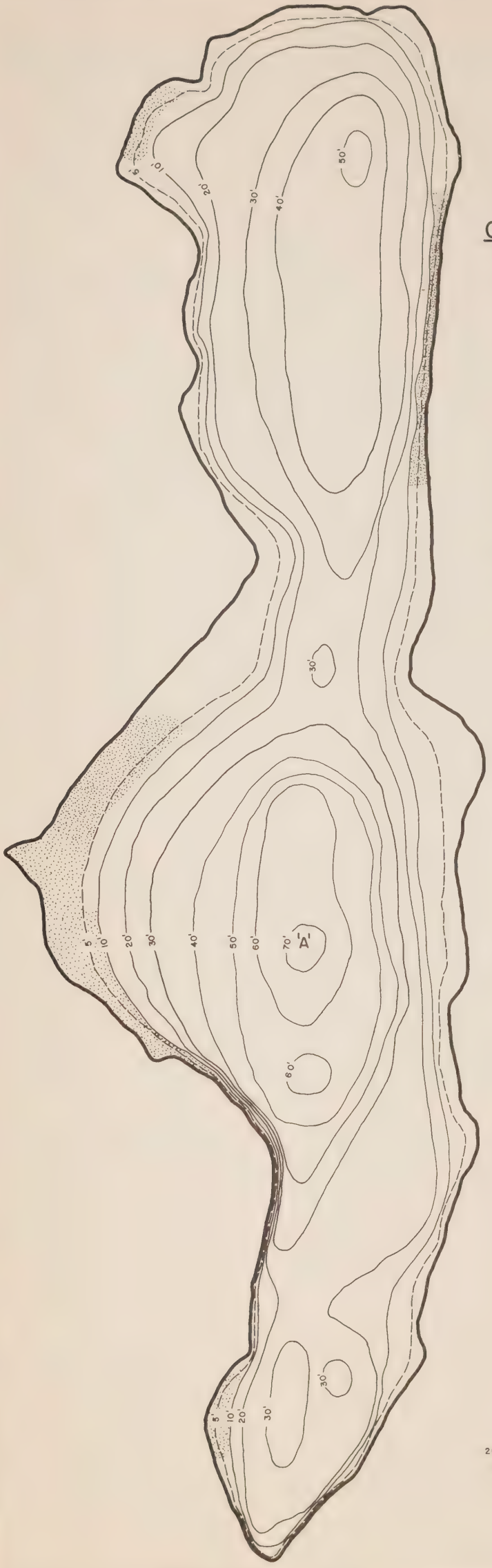
A long succession of stream improvement devices set in place by residents of the Central Lake Ontario Region.

Digger logs well set into the stream bank to make a good hole downstream are a very practical stream improvement device.

A carefully planned and well constructed erosion control structure. Old railroad timbers have been well keyed into the bank.

# CHALK LAKE

## CONTOURS & VEGETATION

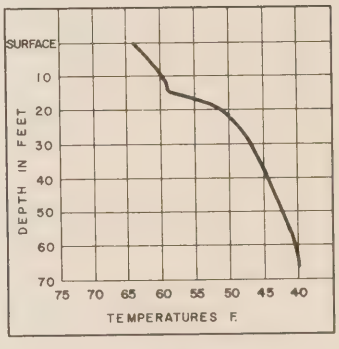



LEGEND

—20'— 10' DEPTH CONTOUR INTERVALS

---5'--- 5' DEPTH CONTOUR

VEGETATION: (CHIEFLY SCIRPUS VALIDUS)




DEPTHS AND TEMPERATURES AT 'A'

JUNE 22 1959

SCALE: FEET

200 100 0 200 400 600

D. P. & D. CONSERVATION BR. 1959 B.B.

the watershed, on a nearby stream. The fencing of a stream from cattle is not essential, but it is certainly an advantage, since by this means an area for watering cattle or a cattle crossing may be given a stone or gravel bottom in order to reduce silting.

It is rapidly becoming difficult to find areas which offer good fishing and which are also available to the general public. One possible remedy for this situation is that the Conservation Authority might make an agreement with a landowner or a group of landowners to allow public fishing in return for some service rendered. Alternatively a Conservation Authority might acquire an area for various conservation purposes, called a Conservation Area (as an official Scheme under the Conservation Authorities Act) and might manage the fishing and improve the streams for fishing, within the area. Many governments, for example that of New York State, have long ago acquired, and still maintain, stretches of first-class trout streams in agricultural as well as other land, so that they will not be lost to the general public.

The stream west of Raglan was considered as needing only the stocking of brook trout, as there is a dam acting as a barrier to it below the station. The stream appeared to be excellent habitat for brook trout although there may be a slight scarcity of food, because the bottom is somewhat sterile and sandy. A few logs would improve this condition.

8. Chalk Lake

The only lake in the watershed is Chalk Lake which lies in the sandy uplands in Reach Township. This lake has a maximum width of 1,100' and is three-quarters of a mile in length.

Most of the lake is more than 20' deep. The greatest depth found was 70'. The chief aquatic vegetation consists of Softstem Bulrush (Scirpus validus) which is very common in the shallow water on the south side and in a narrow band along the north-west edge. Cattails are scattered on the south-west

and eastern shores and Sago Pondweed and Waterlilies are found in a few of the shallow sections. This lake was turbid when visited, with a Secchi disc reading of 32" in the centre on June 24, 1959. The accompanying map shows the depths and temperatures.

The following nine species of fish were collected in a rapid examination of the lake in 1959:

| | |
|---|---|
| Rainbow trout | Fathead minnow |
| White sucker | Pumpkinseed |
| Creek chub | Iowa darter |
| Northern redbelly dace | Brook stickleback |
| Bluntnose minnow | |

Bluntnose minnows appeared to be the most numerous fish when the lake was examined. The northern pike was considered to be extremely common in the lake and there is a report that pike were at one time removed from the lake for sale, by dynamite. There have been reports that splake were being considered for introduction. Since there are already rainbow trout in the lake it is recommended that no other fish be introduced until a survey has shown what success has followed the introduction of the rainbow trout.

9. Farm Fish Ponds

There is ample room for improvement of this type of fishing. The chief research on management of farm fish ponds has been carried on in southern and warmer climates, and therefore the findings cannot be applied without qualification to an area having the climate of Southern Ontario, but some definite recommendations may be made. Suitable methods for the construction of farm ponds are given in a bulletin, "Farm Ponds", which may be obtained from the Ontario Department of Agriculture.

From the fisherman's point of view, farm ponds are of two main kinds:

(a) Trout Ponds

The first is the cool pond with continuous inflowing water and maximum temperatures at the surface of about 75° Fahrenheit with cooler bottom. Ponds of this type are adapted to the

production of speckled or brown trout. They are usually placed near the headwaters and may range in size from about an acre to 8 or 10 acres. Depth should be 10 feet or more in the deepest part. Spring flow of as low as half a cubic foot per second will maintain a pond of one acre.

The outlet of each dam should be a pipe (with a screened inlet at the bottom of the pond) rising close to the normal surface level and there passing through the dam, so that cold water is drained from the bottom and the warmed surface water is not allowed to flow over the dam. The surface water in the pond serves as an insulating layer, and the water below the pond has scarcely been heated by its passage through the pond. The pipe should be of such a size as to discharge the minimum summer flow. In time of flood the additional flow would pour over the dam at a suitable outlet, or be carried around it by a grassed spillway.

The by-pass type of pond has two particular advantages for the production of either speckled or brown trout. A pond of this class is built close to but not on a permanent stream and gets its name from the fact that the water supply is by-passed through a pipe from the stream to the pond. The first advantage is that there is no danger of the pond filling up with silt, because any excessive run-off goes down the permanent stream channel and not through the pond. The other advantage is that by controlling the amount of cold water entering the pond the temperature of the pond may be adjusted to give the maximum growth rate in the fish kept there.

However, trout ponds do not normally have spawning beds for trout and, therefore, must be managed on a put-and-take basis, i.e., stocked artificially.

(b) Warm-Water Ponds

The second and commoner type of farm pond is the warm-water pond. Most farms have at least one low spot suitable for a fish pond. It is frequently good practice to have separate

ponds devoted to wildlife and fish and to control the aquatic plants in the fish pond.

In managing warm-water ponds for fish the following points should be kept in mind.

(1) A minimum depth of 12 feet over at least 25 per cent of the pond should be planned to avoid excessive winter kill, probably the critical factor in fish survival in farm ponds in Ontario.

(2) If suckers, carp or large numbers of minnows are already present in the pond, it is usually best to destroy all fish in the pond before stocking.

(3) It is often necessary to control existing aquatic vegetation. There are both mechanical and chemical methods available.*

(4) Since many of the species commonly recommended for introduction grow very slowly in Ontario waters, research to determine the most satisfactory species will be needed. New ponds and those in which the previous fish have been destroyed might be stocked experimentally with a combination of largemouth bass (Micropterus salmoides) and one of the forage fish species. The most suitable forage fish for farm ponds in the Central Lake Ontario Region would probably be the fathead minnow (Pimephales promelas), which is common in the warmer waters of the region.

If it is found necessary to control the numbers of young largemouth bass, a pure race of the bluegill might be used instead of the minnows, but these would probably have to be imported from the United States, as those found here commonly include hybrids with the pumpkinseed, a smaller fish. Those

---

* Speirs, J. Murray. Summary of Literature on Aquatic Weed Control. Canadian Fish Culturist, 3:(4); August 1948. (Many other chemical compounds have been developed for this purpose since the publication of the above summary).

importing fish should have the arrangement approved by the Provincial Department of Lands and Forests.

The fertilizing of ponds for the increased growth of plankton (the smaller aquatic invertebrates) to provide food for fish, should be approached with caution. Those considering fertilizing ponds should apply to the local District Biologist at Lindsay for advice.

## CHAPTER 5

## THE CRANBERRY MARSH

Where an area provides a natural habitat for an unusual number and variety of animals or birds it should wherever possible be retained in its present condition. One area, known as Le Vay's Marsh, or the Cranberry Marsh, in the property called Eastbourne on the Lake, south-west of Whitby, is certainly worth preserving in its present form. This marsh is separated from Lake Ontario only by a gravel beach and a narrow strip of sand covered with willows.

Two hundred and thirty-two different kinds of birds have been noted in and around this marsh since 1947 by a single family and there is evidence of the nesting of fifty-eight species. Of this great variety of birds, seventy-three different kinds were shore birds or waterfowl.

It is recommended that the Conservation Authority consider the acquisition of this small area of marshland and beach, whose chief value appears to lie in its exceptionally interesting fauna, as a Conservation Area. The fact that this area includes a narrow strip of the beach of Lake Ontario, which is not suitable for building purposes and would be available in summer to all of the people of the watershed, should not be overlooked.